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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,431	07/13/2004	Stanislav A Garyainov	02PCTEZ1	9438

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EXAMINER	
LINDSAY JR, WALTER LEE	
ART UNIT	**PAPER NUMBER**
2812	

DATE MAILED: 02/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/501,431	GARYAINOV ET AL.	
	Examiner	Art Unit	
	Walter L. Lindsay, Jr.	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 11-16* is/are rejected.

7)☒ Claim(s) *7-10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to an Amendment filed 11/25/2004.

Currently, claims 1-16 are pending.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The addition of " a solid, homogeneous, electrically conductive joint", the specification doesn't support a "homogeneous" structure.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims rejected under 35 U.S.C. 103(a) as being unpatentable over Wojnarowski et al. (U.S. Patent No. 5, 900,674 dated 5/4/1999) in view of Brodsky et al. (U.S. Patent No. 5,938,454 dated 8/17/1999).

Wojnarowski shows the method and structure as claimed in Fig. 13-16 and corresponding text as: forming a first electrically conductive pad (112) on a first surface of the first substrate (110), the first pad including an upper portion (114); forming a corresponding second pad (118) on a first surface of the second substrate (116), the second pad including an upper portion (120) (col. 7, line 61-col. 8, line 8) (claim 1).. Wojnarowski teaches that the first substrate (110) comprises a semiconductor die; the first pad (112) comprises one or more signal input/output pads of the die; the second substrate comprises an interconnective substrate of a semiconductor package; and the second pad comprises one or more signal connection pads of the interconnective substrate, whereby the die is electrically interconnected with the substrate (col. 7, line 61-col. 8, line 8) (claim 2). Wojnarowski teaches that the first pad further comprises a frame (122) around a periphery of the first surface of the die; and the second pad further comprises a corresponding frame around a periphery of the first surface of the interconnective substrate, whereby a space inside of the frames and between the respective first surfaces of the die and the substrate is closed and hermetically sealed from the surrounding ambient simulataneously with the electrical interconnection of the die with the substrate (col. 8, lines 14-65) (claim 3). Wojnarowski teaches that the at

least one eutectic alloy components are selected from the group consisting of: Gold (Au); aluminum (Al); germanium (Ge); zinc (Zn); silicon (Si); cadmium (Cd); tin (Sn); copper (Cu); bismuth (Bi); silver (Ag); and lead (Pb) (col. 8, lines 32-43) (claim 4). Wojnarowski teaches the molding of a monolithic body (113) of a dielectric plastic over the die and at least a portion of the interconnective substrate thereby hermetically sealing the die (col. 7, line 61-col. 8, line 8) (claim 11). Wojnarowski teaches the placing a lid over the die and forming a continuous seal around a periphery of the die and between a peripheral portion of the lid and the interconnective substrate thereby hermetically sealing the die. (col. 8, lines 14-65). Wojnarowski teaches that the second substrate has a second surface opposite to the first surface thereof, the second surface having an electrically conductive land thereon, and further characterized by forming an electrically conductive, hermetically sealed via (220) through the second substrate connecting the second pad to the land (Fig. 13) (col. 7, lines 25-60) (claim 13). Wojnarowski teaches that the land and the via are laterally offset from the second pad (Fig. 13) (col. 7, lines 25-60) (claim 14). Wojnarowski teaches the structure of claim 15 (col. 7-col. 8) (claim 15). Wojnarowski teaches the structure of claim 16 (col. 7-col. 8) (claim 16).

Wojnarowski lacks anticipation only in not explicitly teaching that: 1) at least one sharp upstanding peak is formed on an upper surface of at least one of the first and second pads; urging the respective first surfaces of the first and second substrates toward each other such that the respective upper surfaces of the first and second pads are brought together in a forceful opposing abutment with each other; heating the

opposing pads to at least the soldering temperature of the eutectic alloy and until the at least one sharp upstanding peak on the at least one pad penetrates through any oxide films on the respective upper surfaces of the pads and contacts the upper surface of the opposing other pad, thereby intitiating melting and dissolution of the respective upper portions of the opposing pads, including the sharp upstanding peaks, into each other; and cooling the opposing pads to solidify the dissolved, molten upper portions thereof into a solid, homogeneous, electrically conductive joint between the pads (claim 1); 2)at least one of the respective upper portions of the first and the second pads (14, 16, 20, 22) is formed by a vacuum deposition process or an electroplating process (claim 5); and the at least one sharp upstanding peak is formed by a vacuum deposition process (claim 6).

Brodsky shows the electrical connector assembly for connecting first and second circuitized substrates. Brodsky shows dendritic structures (63) are form on conductive pads (90) these dendritic structures aid to connect the two substrates (col. 3, lines 34-col. 4, lines 15). These structures are heated and cooled in order to solidify the dendritic members (col. 4, lines 16-34) and (col. 4, lines 53-64). These structures provide an electrical connector assembly, which provides sound effective contact pressure between two different substrates in a reliable manner (col. 1, lines 49-51).

It would have been obvious to one of ordinary skill of the art, at the time the invention was made, to modify Wojnarowski, by forming upstanding peaks, as taught by Brodsky, with the motivation that Brodsky teaches that the upstanding or dendritic

structures an electrical connector assembly, which provides sound effective contact pressure between two different substrates in a reliable manner.

Response to Arguments

4. Applicant's arguments filed 11/25/2005 have been fully considered but they are not persuasive. The dendritic structures of Brodsky still fall in the class of sharp upstanding peaks and the upper portion of the pad (denritic structures) are melted.

Allowable Subject Matter

5. Claims 7-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter L. Lindsay, Jr. whose telephone number is (571) 272-1674. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Walter L. Lindsay, Jr.
Examiner
Art Unit 2812

WLL
February 1, 2006

MICHAEL LEBENTRITT
SUPERVISORY PATENT EXAMINER